

FLEA CIRCUS: TINY ENTERTAINERS, BIG ENTERTAINMENT

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ABSTRACT

Fleas are very peculiar creatures. They have been around the prehistoric ages present around us infesting various animals as well as human beings. Fleas, being small and frail looking creatures, actually hold much untapped strength that has been converted into a form of a small circus by our past entertainers. This article touches on the topic of flea lives and how humans came to understand them for their own entertainment.

Introduction:

As I mentioned earlier, Fleas have been around the world since the Jurassic ages, about 125 to 150 million years. It has been strongly believed that they have evolved through evolution of marsupials and insectivores (6). There are around 200 genera while the species of fleas ranges to about 2518. This certainly isn't a small number, but some flea species are more important than others, i.e., Cat flea (*Ctenocephalides felis*), Dog Flea (*Ctenocephalides canis*), and Human Flea (*Pulex Irritans*) (7, 4).

Life Cycle:

The life of a flea consists of several stages, namely four that being Egg, Larvae, Pupa and Adult. The flea life cycle is a complete metamorphosis. The flea's life cycle can normally range from 14 to 140 days (about 4 and a half months). This wide range of fluctuation is normally due to different species and environmental factors. These can be temperature as well as humidity. The events that take place in the formation of an adult flea are usually divided into 3. The first being hatching of the egg, period from 1st instar to pupa and the development of pupa to adult (8). It is at this age the fleas can be used for miniature circuses.

Treatment and Control:

Fleas have existed for a long time and with a hefty number of species to their name too. So, the research on their treatment as well as control has been pretty thorough in the 21st century. Over the years, entomologists have been trying their best to produce ecologically friendly ways to control fleas. Fleas normally could be controlled using topical methods as well as systemic methods. The spot-on methods being fipronil and imidacloprid and the systemic one being lufenuron, but if we were to reference the biological methods, the fastest one being the use of the spores produced from *Beauveria bassiana* while under the influence of red LED light. This showed great promise as the mortality rate was 100% in just a span of 36 hours (about 1 and a half days). The use of spores is great, and all but it also comes with the problems of environmental contamination so it's much better to use the different spot-on as well as systemic methods for flea control as well as treatment. There have been multiple attempts to make a vaccine against fleas so that antibodies can be produced against fleas, but it has hit a roadblock in recent years (11).

Flea Circus:

The flea circus emerges as a unique and enigmatic spectacle to everyone around the world, bringing a huge boost of entertainment for everyone involved. A major part of history has considered fleas as pests and that's true nowadays too but from 1840 to 1930 two flea enthusiasts, Louis Bertolotto and William Heckle viewed fleas in a totally different light from everyone else. They looked at fleas as tiny entertainers. They tried to promote their study of fleas in the form of pamphlets that contained different lifecycle stages of fleas as well as their own research on fleas. It didn't pull many people at first but as the budget increased due to the involvement of Charles Rothschild so did the audience (1). The Flea circus usually consists of small chariots made of brass, tightropes, Merry-go-rounds and small metal dresses. The fleas are tied to the chariots using gold wires that are tied around their neck (5, 9). These insects, being extremely small, hold huge power in their legs. They can jump up to 5 inches in height and 8 inches in length. This is due to the presence of Resilin in their legs that acts as a high-powered spring (2, 3). Flea circuses used to be extremely popular in the 20th century, which usually died around 1976. This decline was due to WWII as well as the diseases that came with them (Bubonic Plague) (12). There was also guidance to use different types of fleas, Afterall there are 2500 species, but they cannot be used as the other species do not have the same power to pull carriages as do the Human fleas (*Pulex Irritans*). Hence, the age of flea circuses came to an end in the 21st century (10).

Conclusion:

The captivating world of fleas really shows the lengths that humans go for their amusement and fascination. Fleas, being small beings, still have the strength to pull objects 8 times their own size, which was a source of entertainment in small arenas in the mid-20th century. Nowadays due to various marvels of human technology, we have forgotten all about flea circuses. Fleas' circuses, being amusing and captivating, had too many flaws which assisted in its downward trend. In the end, a pest retained its status as nothing more than a simple pest.

References

- [1] Andrea, B. (2017). Fanciful but Not Forgotten.: A Historical Examination of the Study of the Flea, 1840-1930, 10273137. (2017), 1-24. <https://www.proquest.com/openview/1b88f7ba1dfc49373d79d5e0759e6a0/1?pq-origsite=gscholar&cbl=18750>
- [2] Attenborough, D. (2015). Watch | David Attenborough's Natural Curiosities: The Flea Circus [Sir David Attenborough returns to Watch with a brand new and exclusive series of his award-winning David Attenborough's Natural Curiosities. In the third of this critically acclaimed popular natural history series, Sir David showcases some of nature's most]. [www.youtube.com](https://www.youtube.com/watch?v=xwnwEJcdvsk&ab_channel=UKTVPlay)
- [3] Burrows, M. (2009). How fleas jump. *Journal of Experimental Biology*, 212(2009), 2881-2883. <https://doi.org/10.1242/jeb.022855>
- [4] C., B. P., & P. S. J. (1989). A Biogeography of the Human Flea, *Pulex irritans* L. (Siphonaptera: Pulicidae). *Journal of Biogeography*, 16(2) (1989), 115-120. <https://www.jstor.org/stable/2845085>
- [5] Cockerill, T. (2012). Secrets of the Flea Circus [Tim Cockerill is an entomologist by day and a circus performer by night. It seems only natural that he would become fascinated by the flea circus. Did they use real fleas? How did they work? What do you feed a flea? He tells us what he found, illustrated b]. [www.youtube.com](https://www.youtube.com/watch?v=kfQ36aXMSfY&ab_channel=WellcomeCollection)
- [6] Durden, L. A., & Hinkle, N. C. (2019). Fleas (Siphonaptera). *Medical and Veterinary Entomology*, 2019(Third Edition), 145-169. <https://www.sciencedirect.com/science/article/abs/pii/B9780128140437000108>
- [7] Durden, L. A., Judy, T. N., Martin, J. E., & Spedding, L. S. (2005). Fleas parasitizing domestic dogs in Georgia, USA: Species composition and seasonal abundance. *Veterinary Parasitology*, Issues 1-2(2005), 157-162. <https://www.sciencedirect.com/science/article/abs/pii/S0304401705001196>
- [8] F., K., & N., M. (n.d.). Developmental Cycle of Fleas. *Flea Biology and Control: The Biology of the Cat Flea Control and Prevention with Imidacloprid in Small Animals*, 5(2001), 17-34. https://link.springer.com/chapter/10.1007/978-3-642-56609-7_5
- [9] Logunov, D. (2007). (Fleas: circus artistes or mass murderers? *BIOLOGICAL SCIENCES REVIEW*, 20(2007), 25. http://szmn.eco.nsc.ru/Personal/logunov/Log_Fleas_2007.pdf
- [10] Mortier, K. (2022). The Curious History of Flea Circuses. <https://www.royensoc.co.uk/wp-content/uploads/2023/02/Gaia-Mortier-To-Flea-or-Not-To-Flea-The-Curious-History-of-Flea-Circuses-Gaia-Mortier.pdf>
- [11] Rust, M. K. (n.d.). Recent Advancements in the Control of Cat Fleas. *Insects*, 11(2020), 10. <https://www.mdpi.com/2075-4450/11/10/668>
- [12] Sebbane, F., Jarrett, C. O., Gardner, D., Long, D., & Hinnebusch, B. J. (2006). Role of the <I>Yersinia pestis</I> plasminogen activator in the incidence of distinct septicemic and bubonic forms of flea-borne plague. *Proceedings of the National Academy of Sciences*, 103(2006), 5526-5530. <https://doi.org/10.1073/pnas.0509544103>.